

Message

From: d'Almeida, Carolyn K. [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=9EC4401AFA1846DD93D52A0DDA973581-CDALMEID]
Sent: 5/11/2017 11:42:03 PM
To: Henning, Loren [Henning.Loren@epa.gov]
Subject: FW: Time of Remediation Estimates for EBR
Attachments: TOR Estimates_ST012_041717.pdf

Don't know if you got Bo's model calculations

Carolyn d'Almeida
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"Because a waste is a terrible thing to mind..."

From: d'Almeida, Carolyn K.
Sent: Thursday, May 11, 2017 4:39 PM
To: Bo Stewart <Bo@praxis-enviro.com>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>
Cc: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; 'Dan Pope' <DPope@css-inc.com>; Davis, Eva <Davis.Eva@epa.gov>; Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <KBrasaemle@TechLawInc.com>; Henning, Loren <Henning.Loren@epa.gov>
Subject: FW: Time of Remediation Estimates for EBR

Thanks Bo; I'm not sure if I saw this before or not, but I certainly did not have time to read it as we were just starting field work when you sent it. I still think we need a much more condensed executive summary for the management team, no more than a 2-3 paragraphs summarizing the variables and range of TOR estimates and the rest will be submitted as appendices.

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"Because a waste is a terrible thing to mind..."

From: Bo Stewart [<mailto:Bo@praxis-enviro.com>]
Sent: Thursday, May 11, 2017 4:16 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Wayne Miller <Miller.Wayne@azdeq.gov>
Subject: Fwd: Time of Remediation Estimates for EBR

Hi Carolyn,

In case you missed this email while you were away, I've sent it again. Doug's spreadsheet is a simplified version that would not require much description if accompanied by this memo. I haven't received any comments from

Dan or Eva on the memo. I would like to add a preamble to the front of it describing its purpose, limitations, etc before the AF sees it and I could also describe Doug's spreadsheet briefly.

Bo

----- Forwarded Message -----

Subject:Time of Remediation Estimates for EBR
Date:Tue, 18 Apr 2017 14:48:42 -0700
From:Bo Stewart <Bo@praxis-enviro.com>
Organization:Praxis Environmental Tech., Inc.
To:Steve Willis <steve@uxopro.com>, Wayne Miller
<Miller.Wayne@azdeq.gov>, Jennings, Eleanor
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Hi All,

Steve asked me to go ahead and forward the attached memorandum. The memo describes modeling and calculations for the time to attain RAO-like results (averaged over the NAPL source zones) using EBR. The approach is similar to Doug's in his spreadsheet. The model description and mathematical equations (Appendix B) were reviewed by Michael Brooks at EPA ORD (excluding the Monod kinetics) when it was used in the FFS at the McCormack & Baxter Superfund site in 2014. It was also used for the FFS at the Wyckoff Superfund site. I had to add the Monod kinetics to make it applicable to EBR at ST012.

The model is only applied to the EBR targets defined in the Amec Worksheets for the NAPL remaining (LNAPL Volume Calcs Printable_Rev_030317). No attempt was made to evaluate the TTZ/TIZ since no viable mass estimate exists for the residual NAPL remaining after SEE.

For the assumed field conditions and the underlying model assumptions for Monod kinetics, the range of estimates for the LSZ is 8 to 23 years. The calculated range for the UWBZ is 92 to 136 years. Allowing undefined improvements to yield a 10-fold increase to the utilization rates in the UWBZ resulted in a calculated range of 17 to 43 years.

Bo

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Lloyd "Bo" Stewart, PhD, PE
Praxis Environmental Tech., Inc.